The *DISCERNN* Project

CS5100/CS6100 - Spring 2017

DISCERNN is a system providing the functionality necessary to study the fundamental nature of the relation between computing with automata vs. recurrent neural networks. Functions to be developed include:

1. A CVS development system
2. An interface (GUI)
3. Library Operations (on FSA, Probabilistic FSA (PFSA), DPDA, TM, L programs, RNNs)
	* add
	* delete
	* replace
	* dir
4. Conversion operations
	* FSA 🡪 L program
	* FSA 🡪 RNN
	* L program 🡪 RNN
	* DPDA 🡪 RNN
	* TM 🡪 L program
	* FSA 🡪 regular language
	* DPDA 🡪 CFG
	* CFG 🡪 Chomsky Normal Form Grammar
	* PDFA 🡪 RNN
	* RNN 🡪 TM
	* TM 🡪 grammar
5. Execute operations
	* FSA
	* PFSA
	* L program
	* DPDA
	* RNN (with multi-step input)
	* TM
6. Equality Check
	* FSA – FSA
	* L program – L program
	* DPDA – DPDA
	* FSA – RNN
	* L program – RNN
	* DPDA – RNN
	* RNN – RNN
	* PFSA – PFSA
7. Other issues
	* Trained RNN (using backprop)
	* Decidability
	* Complexity
	* Performance Analysis
	* Information Measures